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Regioselective synthesis of 6-halomethyl-5,6-dihydro-4*H*-1,2-oxazines based on cyclizations of arylalkenyl-oximes

Vahuni Karapetyan [a,b], Satenik Mkrtchyan [a,b], Tung T. Dang [a], Alexander Villinger [a], Helmut Reinke [a], Peter Langer [a,c,*]

[a] *Institut für Chemie, Universität Rostock, Albert-Einstein-Strasse 3a, 18059 Rostock, Germany*
[b] *Faculty of Chemistry, Yerevan State University, Alex Manoogian 1, 0025 Yerevan, Armenia*
[c] *Leibniz-Institut für Katalyse e. V. an der Universität Rostock, Albert-Einstein-Strasse 29a, 18059 Rostock, Germany*

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ABSTRACT

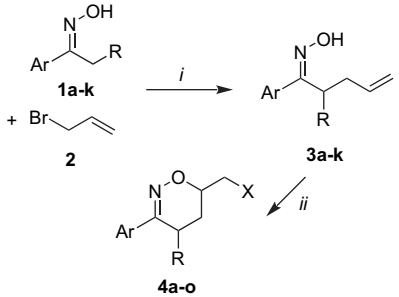
6-Iodo- and 6-bromomethyl-5,6-dihydro-4*H*-1,2-oxazines were prepared by condensation of dilithiated acetophenone-oximes with allylbromide and subsequent regioselective iodine- or NBS-mediated cyclization.

1. Introduction

1,2-Oxazines are of pharmacological relevance and represent useful synthetic building blocks. They have been used, for instance, as intermediates during the synthesis of glycosidase inhibitor analogues[1] and functionalized pyrroles.[2] 1,2-Oxazines have been prepared, for example, by hetero-Diels–Alder reactions of alkenes with ene-nitroso compounds derived from α-haloximes[3] and by hetero-Diels–Alder reactions of dienes with nitroso compounds.[4] 1,2-Oxazines are also available by NBS-,[5] diphenyldiselenide-,[6] acid-[7] and UV-mediated[8] cyclization of alkenyl-substituted oximes. 1,2-Oxazines have also been prepared by base-mediated cyclizations of γ-chloroximes[9] and γ-sulfonyloximes.[10] Other synthetic approaches to 1,2-oxazines rely on Lewis acid-catalyzed reactions of allenoximes,[11] acid-catalyzed cyclization of cyclopropyloximes[12] and on cyclizations of γ-nitroketones.[13] Recently, we have reported[14] the synthesis of 1,2-oxazines by cyclization[15] of oxime dianions with epibromohydrin. Herein, we report what are, to the best of our knowledge, the first syntheses of 6-iodomethyl-5,6-dihydro-4*H*-1,2-oxazines by condensation of oxime dianions with allylbromide and subsequent O-regioselective iodine-mediated cyclization.

2. Results and discussion

The reaction of the dianions of oximes **1a**–**k**, generated by means of *n*-BuLi (2.5 equiv), afforded the arylalkenyl-oximes **3a**–**k** in good yields (Scheme 1, Table 1). The reaction of the latter with iodine afforded the 6-iodomethyl-5,6-dihydro-4*H*-1,2-oxazines **4a**–**k** in moderate to excellent yields. The best yields were obtained when the reaction was carried out in dichloromethane using a saturated aqueous solution of sodium bicarbonate as the base. The reaction of **3e**,**f**,**j**,**k** with *N*-bromosuccinimide (NBS) afforded the 6-bromomethyl-5,6-dihydro-4*H*-1,2-oxazines **4l**–**o**. The tricyclic oxazine **4p** was prepared in high yield from tetralone (**1l**) (Scheme 2). The structure of all products was established by spectroscopic methods. The structures of **4d**,**f**,**j** were independently confirmed by X-ray crystal structure analyses (Figs. 1–3).[16] Products **4j**,**k** and **4n**–**p** were isolated as 1:1 mixtures of diastereomers. In case of **4j**, one of the two diastereomers could be separated by crystallization (Fig. 3).



Scheme 1. Synthesis of 1,2-oxazines **4a**–**o**. Reagents and conditions: (i) (1) **1** (1.0 equiv), *n*-BuLi (2.5 equiv), THF, 1 h, −78 °C, then 10 min, 20 °C, (2) **2** (2.0 equiv), −78→20 °C, 16 h; (ii) **4a**–**k**: I_2 (2.0 equiv), CH_2Cl_2, $NaHCO_3$ (saturated aqueous solution), 20 °C, 12 h, **4l**–**o**: NBS (1.0 equiv), CH_2Cl_2, 20 °C, 2 h.

The regioselectivity of cyclization requires some discussion. Oximes are ambident nucleophiles, which can react with electrophiles either at the oxygen or at the nitrogen atom. Grigg and

* Corresponding author. Fax: +49 381 4986412.
E-mail address: peter.langer@uni-rostock.de (P. Langer).

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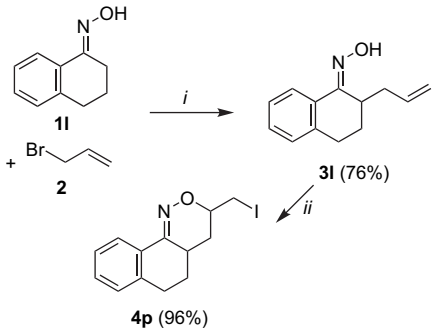
Table 1
Products and yields

1,3	4	X	R	Ar	Yield %	
					3[a]	4[a]
a	**a**	I	H	Ph	85	95
b	**b**	I	H	4-MeC_6H_5	69	83
c	**c**	I	H	3-$(MeO)C_6H_5$	68	66
d	**d**	I	H	4-$(MeO)C_6H_5$	71	67
e	**e**	I	H	2-$(EtO)C_6H_5$	64	96
f	**f**	I	H	4-$(EtO)C_6H_5$	69	61
g	**g**	I	H	4-FC_6H_5	67	81
h	**h**	I	H	4-ClC_6H_5	60	52
i	**i**	I	H	1-Naphthyl	65	66
j	**j**	I	Me	Ph	63	50[b]
k	**k**	I	Me	4-$(MeO)C_6H_5$	60	43[b]
e	**l**	Br	H	2-$(EtO)C_6H_5$	64	57
f	**m**	Br	H	4-$(EtO)C_6H_5$	69	87
j	**n**	Br	Me	Ph	63	73[b]
k	**o**	Br	Me	4-$(MeO)C_6H_5$	60	25[b]

[a] Yields of isolated product.
[b] dr=1:1.



Scheme 2. Synthesis of 1,2-oxazine **4p**. Reagents and conditions: (i) (1) **1** (1.0 equiv), *n*-BuLi (2.5 equiv), THF, 1 h, −78 °C, then 10 min, 20 °C, (2) **2** (2.0 equiv), −78→20 °C, 16 h; (ii) I_2 (2.0 equiv), CH_2Cl_2, $NaHCO_3$ (saturated aqueous solution), 20 °C, 12 h, dr=1:1.

co-workers showed that the regioselectivity is controlled by the *E*/*Z*-configuration of the oxime and by the rate of *E*/*Z*-isomerization with respect to the N- or O-nucleophilic attack.[17–19] The intramolecular reaction of oximes with halonium ions has been reported to result in N-alkylation and formation of nitrones. For example, treatment of a CH_2Cl_2 solution of alkenyl-oxime **5** with iodine and

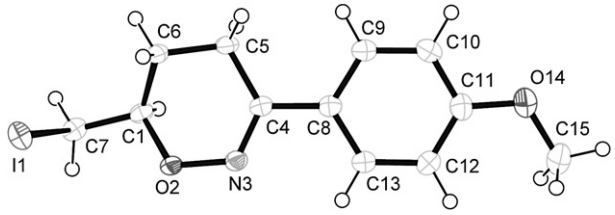


Figure 1. ORTEP plot of **4d** (50% probability level).

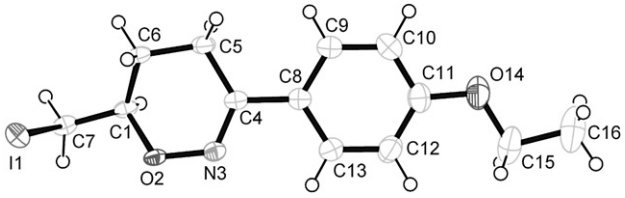


Figure 2. ORTEP plot of **4f** (50% probability level).

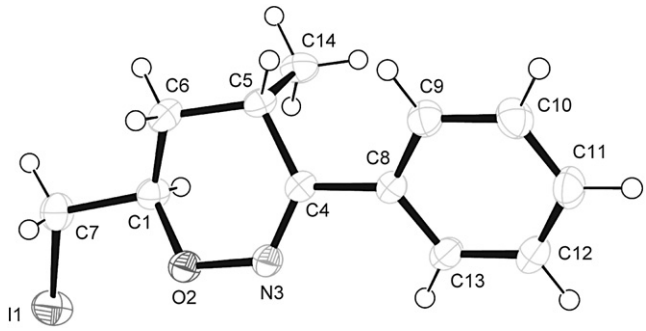
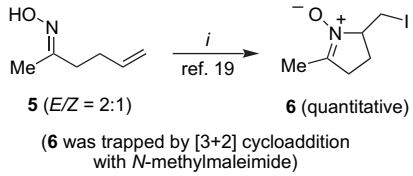


Figure 3. ORTEP plot of **4j** (50% probability level).

anhydrous potassium carbonate quantitatively afforded nitrone **6**, which was trapped by a subsequent [3+2] cycloaddition (Scheme 3).[19] Similar results were obtained for the oxime of ethyl 2-homoallyl-cyclohexanone-2-carboxylate. The N-regioselectivity was explained by a rapid *Z*→*E* isomerization and subsequent attack of the nitrogen atom onto the iodonium ion. The reaction of **5** with *N*-bromosuccinimide (NBS) was reported to give a 2:1 mixture of nitrone and 1,2-oxazine, which reflects the *E*/*Z* ratio of **5**.[5] In this reaction, the *E*/*Z* isomerization was slow compared to the N- and O-cyclization. Similar results have been reported for diphenyl diselenide-mediated cyclizations.[6]



Scheme 3. Synthesis of nitrone **6** by Grigg and co-workers (Ref. 19). Reagents and conditions: (i) I_2 (2.0 equiv), CH_2Cl_2, K_2CO_3 (anhydrous), 25 °C, 12 h.

In contrast to **5**, the aryl-substituted oximes **3a–l** contain an *E*-configured C=N group, due to the steric effect of the aryl group.[20] The excellent O-regioselectivity of the formation of 1,2-oxazines **4a–p** can be explained by the assumption that the *E*→*Z* isomerization is slow compared to the O-regioselective 1,2-oxazine formation.

3. Conclusions

In conclusion, 6-iodo- and 6-bromomethyl-5,6-dihydro-4*H*-1,2-oxazines were prepared by condensation of dilithiated acetophenone-oximes with allylbromide and subsequent regioselective iodine- or NBS-mediated cyclization. The results reported herein show that oxazines are available from alkenyl-oximes containing sterically demanding substituents.

4. Experimental section

4.1. General comments

All solvents were dried by standard methods and all reactions were carried out under an inert atmosphere. For ^1H and ^{13}C NMR spectra the deuterated solvents indicated were used. Mass spectrometric data (MS) were obtained by electron ionization (EI, 70 eV), chemical ionization (CI, H_2O) or electrospray ionization (ESI). For preparative scale chromatography, silica gel (60–200 mesh) was used. Melting points are uncorrected.

4.2. General procedure for the preparation of oximes 3

To a THF solution (20 mL) of oxime **1** (2.0 mmol) was added *n*-butyllithium (5.0 mmol, 2.5 M) at −78 °C. After stirring for 1 h at −78 °C, the mixture was warmed to 20 °C and stirred for 10 min. Subsequently, allylbromide (0.484 g, 4.0 mmol) was added at −78 °C. After warming of the mixture to 20 °C for 16 h, a saturated aqueous solution of NH_4Cl (30 mL) was added. The organic and the aqueous layer were separated and the latter was extracted with ethyl acetate (3×50 mL). The combined organic layers were dried (Na_2SO_4), filtered and the solvent of the filtrate was removed in vacuo. The residue was purified by column chromatography (silica gel, *n*-heptane/EtOAc=5:1).

4.3. General procedure for the synthesis of 1,2-oxazines 4a–k and 4p

To a CH_2Cl_2 solution (15 mL) of **3a–l** (0.81 mmol) and I_2 (0.406 g, 1.6 mmol) was added a saturated aqueous solution of $NaHCO_3$ (16 mL) and the solution was stirred for 12 h at 20 °C. The excess of iodine was removed by addition of a saturated aqueous solution of Na_2SO_3 (40 mL). The organic and the aqueous layer were separated and the latter was extracted with ethyl acetate (3×50 mL). The combined organic layers were dried (Na_2SO_4), filtered and the solvent of the filtrate was removed in vacuo. The residue was purified by column chromatography (silica gel, *n*-heptane→*n*-heptane/EtOAc=4:1).

4.4. General procedure for the synthesis of 1,2-oxazines 4l–o

To a CH_2Cl_2 solution (10 mL) of **3e**,**f**,**j**,**k** (2.0 mmol) was portionwise added NBS (0.356 g, 2.0 mmol) over 15 min at 0 °C. The resultant solution was stirred for 2 h at room temperature. The residue was purified by column chromatography (silica gel, *n*-heptane→*n*-heptane/EtOAc=4:1).

*4.4.1. 6-Iodomethyl-3-phenyl-5,6-dihydro-4H-[1,2]oxazine (**4a**)*

Starting with 1-phenyl-pent-4-en-1-one oxime **3a** (0.141 g, 0.81 mmol), I_2 (0.412 g, 1.62 mmol) and a saturated aqueous solution of $NaHCO_3$ (8.1 mL) in CH_2Cl_2 (14 mL), **4a** was isolated as a brownish solid (0.232 g, 95%); mp 126–128 °C. ^{1}H NMR (300 MHz, $CDCl_3$): δ=1.86 (m, 1H, CHCH_2), 2.34 (m, 1H, CHCH_2), 2.68 (m, 2H, CCH_2), 3.27 (dd, ^2J=10.3 Hz, ^3J=7.3 Hz, 1H, CHCH_2I), 3.42 (dd, ^2J=10.3 Hz, ^3J=5.0 Hz, 1H, CHCH_2I), 3.85 (m, 1H, OCHCH$_2$), 7.38 (m, 3H, CH_{Ar}), 7.68 (m, 2H, CH_{Ar}). ^{13}C NMR (75.5 MHz, $CDCl_3$): δ=5.3 (CH_2I), 21.6, 24.2 (CHCH$_2$CH_2C), 74.1 (*C*HO), 125.4 (CH_{Ar}), 128.5 (CH_{Ar}), 129.7 (CH_{Ar}), 135.1 (C), 154.8 (C). IR (ATR, cm^{-1}): $\tilde{\nu}$=3039 (br, w), 2959 (w), 2905 (br, w), 2853 (w), 1589 (w), 1563 (w), 1490 (w), 1443 (w), 1404 (w), 1378 (w), 1330 (w), 1296 (w), 1260 (w), 1231 (w), 1195 (m), 1161 (w), 1086 (m), 1012 (m), 997 (m), 982 (m), 913 (m), 799 (m), 750 (s), 685 (s), 603 (m). MS (GC/MS, 70 eV): *m*/*z* (%)=301 (M$^+$, 100), 207 (6), 174 (17), 156 (48), 144 (30), 128 (38), 118 (59), 104 (51), 77 (70). HRMS (EI): calcd for $C_{11}H_{12}NOI$ (M$^+$): 300.99581, found: 300.995322.

*4.4.2. 6-Iodomethyl-3-p-tolyl-5,6-dihydro-4H-[1,2]oxazine (**4b**)*

Starting with 1-(3-tolyl)pent-4-en-1-one oxime **3b** (0.342 g, 1.80 mmol), I_2 (0.914 g, 3.60 mmol) and a saturated aqueous solution of $NaHCO_3$ (18 mL) in CH_2Cl_2 (30 mL), **4b** was isolated as a colourless solid (0.471 g, 83%); mp 120–122 °C. ^{1}H NMR (250 MHz, $CDCl_3$): δ=1.85 (m, 1H, CH_2), 2.32 (m, 1H, CHCH_2), 2.36 (s, 3H, $C_{Ar}CH_3$), 2.68 (m, 2H, CCH_2), 3.25 (dd, ^2J=10.5 Hz, ^3J=7.3 Hz, 1H, CHCH_2I), 3.41 (dd, ^2J=10.5 Hz, ^3J=5.0 Hz, 1H, CHCH_2I), 3.84 (m, 1H, OCHCH$_2$), 7.18 (d, ^3J=8.1 Hz, 2H, CH_{Ar}), 7.57 (d, ^3J=8.1 Hz, 2H, CH_{Ar}). ^{13}C NMR (75.5 MHz, $CDCl_3$): δ=5.5 (CH_2I), 21.3 ($C_{Ar}CH_3$), 21.6, 24.3 (CHCH$_2$CH_2C), 74.0 (*C*HO), 125.3 (CH_{Ar}), 129.2 (CH_{Ar}), 132.3 (C), 139.8 (C), 154.8 (C). IR (KBr, cm^{-1}): $\tilde{\nu}$=3431 (br, w), 3034 (m), 2935 (br, w), 2910 (w), 1611 (w), 1592 (w), 1510 (w), 1418 (w), 1407 (m), 1380 (m), 1335 (s), 1297 (m), 1233 (m), 1198 (s), 1163 (w), 1111 (w), 1088 (w), 1062 (w), 1013 (s), 936 (w), 915 (s), 812 (s), 760 (w), 710 (w). MS (GC/MS, 70 eV): *m*/*z* (%)=315 (M$^+$, 100), 188 (9), 174 (20), 143 (14), 132 (32), 117 (33), 105 (9), 91 (40), 77 (7), 65 (17). HRMS (EI): calcd for $C_{12}H_{14}NOI$ (M$^+$): 315.01146, found: 315.011582.

*4.4.3. 6-Iodomethyl-3-(3-methoxyphenyl)-5,6-dihydro-4H-[1,2]oxazine (**4c**)*

Starting with 1-(4-methoxyphenyl)pent-4-en-1-one oxime **3c** (0.205 g, 1 mmol), I_2 (0.508 g, 2 mmol) and a saturated aqueous solution of $NaHCO_3$ (5 mL) in CH_2Cl_2 (10 mL), **4c** was isolated as a brownish oil (0.219 g, 66%). ^{1}H NMR (300 MHz, $CDCl_3$): δ=1.76 (m, 1H, CH_2), 2.22 (m, 1H, CH_2), 2.55 (m, 2H, CH_2), 3.19, 3.35 (t, 2H, CH_2), 3.75 (m, 1H, CH), 3.80 (s, 3H, OCH_3), 7.12–7.25 (m, 3H, Ar), 7.85 (s, 1H, Ar). ^{13}C NMR (75 MHz, $CDCl_3$): δ=6.7, 22.0, 24.5 (3C, CH_2), 55.4 (C, CH_3), 74.1 (C, CH), 110.4, 116.3, 119.5, 129.6 (4C, ArCH), 136.6, 154.6 (2C, ArC), 159.6 (C, CN). IR (KBr, cm^{-1}): $\tilde{\nu}$=3067 (w), 2994 (w), 2954 (w), 2932 (w), 2832 (w), 1597 (m), 1568 (m), 1425 (m), 1287 (m), 1234 (m), 1175 (m), 1038 (s), 924 (m), 823 (m), 779 (m), 688 (m). MS (EI, 70 eV): *m*/*z* (%)=332 (M$^+$, 14), 331 (100), 204 (14), 190 (21), 187 (16), 186 (18), 178 (20), 133 (23). HRMS (EI, 70 eV): calcd for $C_{12}H_{14}NO_2I$ (M$^+$): 331.00637; found: 331.006082.

*4.4.4. 6-Iodomethyl-3-(4-methoxyphenyl)-5,6-dihydro-4H-[1,2]oxazine (**4d**)*

Starting with 1-(4-methoxyphenyl)pent-4-en-1-one oxime **3d** (0.478 g, 2.33 mmol), I_2 (1.184 g, 4.66 mmol) and a saturated aqueous solution of $NaHCO_3$ (23.3 mL) in CH_2Cl_2 (40.0 mL), **4d** was isolated as a red solid (0.517 g, 67%); mp 140 °C. ^{1}H NMR (300 MHz, $CDCl_3$): δ=1.84 (m, 1H, CH_2), 2.31 (m, 1H, CHCH_2), 2.66 (m, 2H, CCH_2), 3.26 (dd, ^2J=10.6 Hz, ^3J=7.2 Hz, 1H, CHCH_2I), 3.41 (dd, ^2J=10.6 Hz, ^3J=5.0 Hz, 1H, CHCH_2I), 3.81 (s, 3H, OCH_3), 3.83 (m, 1H, OCHCH$_2$), 6.88 (d, ^3J=9.0 Hz, 2H, CH_{Ar}), 7.63 (d, ^3J=9.0 Hz, 2H, CH_{Ar}). ^{13}C NMR (75.5 MHz, $CDCl_3$): δ=5.4 (CH_2I), 21.6 (CH_2), 24.3 (CH_2), 55.3 (OCH_3), 74.0 (*C*HO), 113.8, 126.8 (CH_{Ar}), 127.5, 154.5, 160.9 (C). IR (KBr, cm^{-1}): $\tilde{\nu}$=2951 (w), 2905 (w), 2834 (w), 1611 (s), 1514 (s), 1462 (w), 1334 (w), 1295 (m), 1258 (s), 1199 (m), 1175 (s), 1030 (m), 1016 (m), 920 (m), 823 (s), 646 (w). MS (EI, 70 eV): *m*/*z* (%)=331 (M$^+$, 100), 187 (11), 172 (11), 133 (26), 90 (8), 77 (11). HRMS (EI): calcd for $C_{12}H_{14}NO_2I$ (M$^+$): 331.00637, found: 331.006054. Anal. Calcd for $C_{12}H_{14}NO_2I$ (331.15): C, 43.52; H, 4.26; N, 4.23. Found: C, 43.68; H, 4.30; N, 3.91.

*4.4.5. 3-(2-Ethoxyphenyl)-6-iodomethyl-5,6-dihydro-4H-[1,2]oxazine (**4e**)*

Starting with 1-(2-ethoxyphenyl)pent-4-en-1-one oxime **3e** (0.438 g, 2.00 mmol), I_2 (1.016 g, 4.00 mmol) and a saturated aqueous solution of $NaHCO_3$ (20 mL) in CH_2Cl_2 (34 mL), **4e** was isolated as a brownish viscous (0.656 g, 95%). ^{1}H NMR (250 MHz, $CDCl_3$): δ=1.40 (t, ^3J=7.0 Hz, 3H, OCH_2CH_3), 1.84 (m, 1H, CHCH_2CH$_2$), 2.27 (m, 1H, CHCH_2CH$_2$), 2.69 (dd, ^2J=8.3 Hz, ^3J=5.5 Hz, 2H, CCH_2), 3.28 (dd, ^2J=10.2 Hz, ^3J=7.7 Hz, 1H, CHCH_2I), 3.44 (dd, ^2J=10.2 Hz, ^3J=4.9 Hz, 1H, CHCH_2I), 3.96 (m, 1H, OCHCH$_2$), 4.05 (q, ^3J=7.0 Hz, 2H, OCH_2CH_3), 6.92 (m, 2H, CH_{Ar}), 7.32 (m, 2H, CH_{Ar}). ^{13}C NMR (62.9 MHz, $CDCl_3$): δ=5.8 (CH_2I), 14.8 (OCH_2CH_3), 24.1, 24.2 (CHCH$_2$CH_2C), 63.8 (OCH_2CH_3), 74.2 (*C*HO), 111.9 (CH_{Ar}), 120.6 (CH_{Ar}), 125.7 (C), 129.6 (CH_{Ar}), 130.4 (CH_{Ar}), 156.6, 158.5 (C). IR (ATR, cm^{-1}): $\tilde{\nu}$=3061 (br, w), 2975 (w), 2927 (w), 2875 (w), 1600 (m), 1490 (m), 1446 (s), 1391 (m), 1290 (m), 1237 (s), 1161 (m), 1122 (s), 1039 (s), 1010 (m), 892 (s), 802 (w), 750 (s), 681 (m), 640 (w), 604 (m). MS (EI, 70 eV): *m*/*z* (%)=345 (M$^+$, 9), 313 (54), 256 (2), 204 (27), 185 (28), 158 (22), 145 (100), 128 (36), 119 (24), 91 (22), 77 (13). HRMS (EI): calcd for $C_{13}H_{16}NO_2I$ (M$^+$): 345.02202, found: 345.022935.

4.4.6. 3-(4-Ethoxyphenyl)-6-iodomethyl-5,6-dihydro-4H-[1,2]oxazine (**4f**)

Starting with 1-(4-ethoxyphenyl)pent-4-en-1-one oxime **3f** (0.438 g, 2.00 mmol), I_2 (1.016 g, 4.00 mmol) and a saturated aqueous solution of $NaHCO_3$ (20 mL) in CH_2Cl_2 (34 mL), **4f** was isolated as a brownish solid (0.352 g, 51%); mp 131–135 °C. ^{1}H NMR (250 MHz, $CDCl_3$): δ=1.41 (t, ^3J=7.0 Hz, 3H, OCH_2CH_3), 1.84 (m, 1H, $CHCH_2CH_2$), 2.32 (m, 1H, $CHCH_2CH_2$), 2.65 (m, 2H, CCH_2), 3.25 (dd, ^2J=10.8 Hz, ^3J=7.3 Hz, 1H, $CHCH_2I$), 3.41 (dd, ^2J=10.8 Hz, ^3J=5.1 Hz, 1H, $CHCH_2I$), 3.82 (m, 1H, $OCHCH_2$), 4.04 (q, ^3J=7.0 Hz, 2H, OCH_2CH_3), 6.87 (d, ^3J=9.0 Hz, 2H, CH_{Ar}), 7.61 (d, ^3J=9.0 Hz, 2H, CH_{Ar}). ^{13}C NMR (62.9 MHz, $CDCl_3$): δ=5.5 (CH_2I), 14.7 (OCH_2CH_3), 21.2, 24.3 ($CHCH_2CH_2C$), 63.5 (OCH_2CH_3), 73.9 (CHO), 114.3 (CH_{Ar}), 126.7 (CH_{Ar}), 127.4 (C), 154.4 (C), 160.2 (C). IR (ATR, cm^{-1}): $\tilde{\nu}$=3047 (w), 2976 (w), 2929 (w), 1608 (s), 1590 (m), 1510 (s), 1481 (m), 1444 (w), 1394 (m), 1334 (m), 1296 (w), 1253 (s), 1232 (m), 1196 (m), 1174 (m), 1116 (m), 1046 (m), 1015 (s), 984 (w), 916 (m), 817 (s), 759 (w), 662 (m), 553 (m). MS (EI, 70 eV): *m*/*z* (%)=345 (M^+, 100), 256 (6), 201 (20), 172 (31), 147 (11), 119 (21), 97 (16), 69 (24). Anal. Calcd for $C_{13}H_{16}INO_2$ (345.176): C, 45.23; H, 4.67; N, 4.06. Found: C, 45.17; H, 4.58; N, 3.81. HRMS (EI): calcd for $C_{13}H_{16}NO_2I$ (M^+): 345.02202, found: 345.022376.

4.4.7. 3-(4-Fluorophenyl)-6-iodomethyl-5,6-dihydro-4H-[1,2]oxazine (**4g**)

Starting with 1-(4-fluorophenyl)pent-4-en-1-one oxime **3g** (0.290 g, 1.50 mmol), I_2 (0.762 g, 3.00 mmol) and a saturated aqueous solution of $NaHCO_3$ (15 mL) in CH_2Cl_2 (25 mL), **4g** was isolated as a brownish solid (0.388 g, 81%); mp 129–131 °C. ^{1}H NMR (250 MHz, $CDCl_3$): δ=1.86 (m, 1H, $CHCH_2$), 2.34 (m, 1H, $CHCH_2$), 2.65 (m, 2H, CCH_2), 3.27 (dd, ^2J=10.4 Hz, ^3J=7.2 Hz, 1H, $CHCH_2I$), 3.42 (dd, ^2J=10.4 Hz, ^3J=5.0 Hz, 1H, $CHCH_2I$), 3.84 (m, 1H, $OCHCH_2$), 7.05 (m, 2H, CH_{Ar}), 7.67 (m, 2H, CH_{Ar}). ^{13}C NMR (62.9 MHz, $CDCl_3$): δ=5.2 (CH_2I), 21.6, 24.1 ($CHCH_2CH_2C$), 74.1 (CHO), 115.5 (d, ^2J=22.0 Hz, $CHCHCF_{Ar}$), 127.2 (d, ^3J=8.5 Hz, $CHCHCF_{Ar}$), 131.3 (d, ^4J=3.3 Hz, $CCHCHCF_{Ar}$), 153.8 (CN), 163.6 (d, ^1J=249.7 Hz, $CHCF_{Ar}$). IR (ATR, cm^{-1}): $\tilde{\nu}$=3053 (w), 2933 (br, w), 2904 (w), 2872 (w), 1606 (m), 1508 (s), 1444 (w), 1405 (w), 1379 (w), 1331 (m), 1294 (w), 1232 (s), 1197 (s), 1158 (m), 1099 (m), 1061 (w), 1012 (m), 1002 (m), 986 (m), 913 (s), 852 (m), 829 (s), 785 (w), 758 (w), 644 (m), 552 (s). MS (EI, 70 eV): *m*/*z* (%)=319 (M^+, 100), 192 (16), 174 (37), 162 (16), 148 (14), 136 (47), 121 (40), 95 (19), 83 (18). HRMS (EI): calcd for $C_{11}H_{11}INOF$ (M^+): 318.98639, found: 318.985435.

4.4.8. 3-(4-Chlorophenyl)-6-iodomethyl-5,6-dihydro-4H-[1,2]oxazine (**4h**)

Starting with 1-(4-chlorophenyl)pent-4-en-1-one oxime **3h** (0.209 g, 1.0 mmol), I_2 (0.508 g, 2.0 mmol) and a saturated aqueous solution of $NaHCO_3$ (5 mL) in CH_2Cl_2 (10 mL), **4h** was isolated as a brownish oil (0.172 g, 52%). ^{1}H NMR (300 MHz, $CDCl_3$): δ=1.82 (m, 1H, CH_2), 2.22 (m, 1H, CH_2), 2.65 (q, 2H, CH_2), 3.19 (t, 1H, CH_2), 3.31 (t, 1H, CH_2), 3.75 (m, 1H, CH), 7.25 (d, ^3J=8.2 Hz, 1H, Ar), 7.46 (d, ^3J=8.2 Hz, 1H, Ar). ^{13}C NMR (75 MHz, $CDCl_3$): δ=5.4, 23.0, 26.0 (CH_2), 74.4 (CH), 127.7, 129.3 (4C, ArCH), 134.0, 136.0 (2C, ArC), 153.7 (C, CN). IR (KBr, cm^{-1}): $\tilde{\nu}$=3049 (w), 3005 (w), 2928 (w), 1548 (m), 1456 (m), 1349 (m), 1075 (m), 924 (s), 819 (s), 752 (m). MS (EI, 70 eV): *m*/*z* (%)=336 (M^+, ^{37}Cl, 7), 334 (M^+, ^{35}Cl, 19), 192 (55), 180 (100), 177 (38), 143 (61), 137 (29), 112 (35), 101 (19). HRMS (EI, 70 eV): calcd for $C_{11}H_{11}INOCl$ (M^+, ^{35}Cl): 334.95738; found: 334.95742.

4.4.9. 6-Iodomethyl-4-(naphthalen-1-yl)-5,6-dihydro-4H-[1,2]oxazine (**4i**)

Starting with 1-(1-naphthyl)pent-4-en-1-one oxime **3i** (0.225 g, 1.0 mmol), I_2 (0.508 g, 2.0 mmol) and a saturated aqueous solution of $NaHCO_3$ (5 mL) in CH_2Cl_2 (10 mL), **4i** was isolated as a brownish oil (0.232 g, 66%). ^{1}H NMR (300 MHz, $CDCl_3$): δ=1.92 (m, 1H, CH_2), 2.31 (m, 1H, CH_2), 2.35 (t, 1H, CH_2), 2.41 (t, 1H, CH_2), 2.61 (t, 2H, CH_2), 3.94 (m, 1H, CH), 74.2 (CH), 7.31 (t, ^3J=8.2 Hz, 2H, Ar), 7.38 (d, ^3J=8.2 Hz, 2H, Ar), 7.73 (d, ^3J=8.2 Hz, 1H, Ar), 7.79 (d, ^3J=8.2 Hz, 1H, Ar), 7.87 (t, ^3J=8.2 Hz, 1H, Ar). ^{13}C NMR (75 MHz, $CDCl_3$): δ=5.6, 24.6, 26.3 (CH_2), 74.4 (CH), 125.0, 125.1, 125.7, 126.1, 126.8, 128.5, 129.6 (ArCH), 131.3, 133.8, 133.9 (ArC), 158.0 (C, CN). IR (KBr, cm^{-1}): $\tilde{\nu}$=3044 (w), 2953 (w), 2932 (m), 2852 (m), 1673 (m), 1506 (m), 1368 (m), 1280 (m), 1127 (m), 999 (m), 895 (s), 772 (s). MS (EI, 70 eV): *m*/*z* (%)=351 (M^+, 100), 350 (11), 224 (15), 206 (15), 165 (15), 153 (46), 152 (33), 127 (38). HRMS (EI, 70 eV): calcd for $C_{15}H_{14}NO_2I$ (M^+): 351.01146; found: 351.011650.

4.4.10. 6-Iodomethyl-4-methyl-3-phenyl-5,6-dihydro-4H-[1,2]oxazine (**4j**)

Starting with 2-methyl-1-phenyl-pent-4-en-1-one oxime **3j** (0.378 g, 2.00 mmol), I_2 (1.016 g, 4.00 mmol) and a saturated aqueous solution of $NaHCO_3$ (20 mL) in CH_2Cl_2 (34 mL), **4j** was isolated as a colourless solid (0.315 g, 50%); mp 70–72 °C. The product was isolated as an inseparable mixture of diastereomers (dr=1:1). Therefore, most signals are splitted. ^{1}H NMR (250 MHz, $CDCl_3$): δ=1.08, 1.17 (d, ^3J=7.3 Hz, 3H, $CHCH_3$), 1.57, 1.88 (m, 1H, $CHCH_2CH$), 2.06, 2.47 (m, 1H, $CHCH_2CH$), 3.05 (m, 1H, $CHCH_3$), 3.28 (m, 1H, CH_2I), 3.42 (m, 1H, CH_2I), 3.84 (m, 1H, $OCHCH_2$), 7.37 (m, 3H, CH_{Ar}), 7.48, 7.61 (m, 2H, CH_{Ar}). ^{13}C NMR (62.9 MHz, $CDCl_3$): δ=5.6, 5.9 (CH_2I), 19.1, 20.2 ($CHCH_3$), 25.7, 28.2 ($CHCH_3$), 31.6, 34.7 ($CHCH_2CH$), 70.9, 74.7 (OCH), 126.2, 126.8 (CH_{Ar}), 128.3, 128.5 (CH_{Ar}), 129.1, 129.4 (CH_{Ar}), 134.5, 134.6 (C), 159.1, 161.8 (C). IR (ATR, cm^{-1}): $\tilde{\nu}$=3047 (br, w), 2964 (w), 2929 (w), 2867 (w), 1589 (w), 1493 (w), 1440 (m), 1410 (w), 1376 (w), 1258 (m), 1219 (w), 1187 (m), 1090 (w), 1034 (s), 1007 (s), 965 (s), 928 (w), 897 (s), 765 (s), 739 (m), 689 (s), 609 (m). MS (EI, 70 eV): *m*/*z* (%)=315 (M^+, 100), 256 (27), 239 (11), 188 (20), 170 (27), 132 (52), 117 (45), 104 (35), 77 (46), 55 (52). HRMS (EI): calcd for $C_{12}H_{14}INO$ (M^+): 315.01146, found: 315.011677. Anal. Calcd for $C_{12}H_{14}NOI$ (315.01): C, 45.73; H, 4.48; N, 4.44. Found: C, 45.80; H, 4.42; N, 4.32.

4.4.11. 6-Iodomethyl-3-(4-methoxyphenyl)-4-methyl-5,6-dihydro-4H-[1,2]oxazine (**4k**)

Starting with 1-(4-methoxyphenyl)-2-methylpent-4-en-1-one oxime **3k** (0.657 g, 3.00 mmol), I_2 (1.524 g, 6.00 mmol) and a saturated aqueous solution of $NaHCO_3$ (30 mL) in CH_2Cl_2 (51 mL), **4k** was isolated as a colourless solid (0.445 g, 43%); mp 100–102 °C. The product was isolated as an inseparable mixture of diastereomers (dr=1:1). Therefore, most signals are splitted. For most of the diastereomers, the difference of the chemical shifts is very small. Therefore, only a single value is given. ^{1}H NMR (250 MHz, $CDCl_3$): δ=1.18 (d, ^3J=7.3 Hz, 3H, $CHCH_3$), 1.86 (m, 1H, $CHCH_2CH$), 2.06 (m, 1H, $CHCH_2CH$), 3.03 (m, 1H, $CHCH_3$), 3.27 (dd, ^2J=10.5 Hz, ^3J=6.9 Hz, 1H, $CHCH_2I$), 3.44 (dd, ^2J=10.5 Hz, ^3J=5.1 Hz, 1H, $CHCH_2I$), 3.82 (s, 3H, OCH_3), 3.89 (m, 1H, $OCHCH_2$), 6.90 (d, ^3J=9.0 Hz, 2H, CH_{Ar}), 7.55 (d, ^3J=9.0 Hz, 2H, CH_{Ar}). ^{13}C NMR (62.9 MHz, $CDCl_3$): δ=6.02 (CH_2I), 20.4 ($CHCH_3$), 25.7 ($CHCH_3$), 31.8 ($CHCH_2CH$), 55.3 (OCH_3), 70.9 ($OCHCH_2$), 113.9 (CH_{Ar}), 127.0 (C), 127.6 (CH_{Ar}), 158.6 (C), 160.6 (C). IR (ATR, cm^{-1}): $\tilde{\nu}$=2960 (w), 2930 (w), 2881 (w), 2837 (w), 1606 (m), 1585 (w), 1511 (m), 1456 (m), 1411 (w), 1374 (w), 1346 (w), 1295 (m), 1244 (s), 1178 (m), 1129 (w), 1110 (w), 1093 (w), 1074 (m), 1031 (m), 1007 (m), 961 (m), 927 (m), 899 (s), 860 (m), 831 (s), 814 (s), 749 (m), 725 (w), 639 (m), 628 (s), 608 (m), 551 (m). MS (EI, 70 eV): *m*/*z* (%)=345 (M^+, 91), 256 (50), 239 (19), 201 (17), 186 (16), 133 (19), 111 (25), 102 (45), 83 (64), 69 (69), 57 (100). HRMS (EI): calcd for $C_{13}H_{16}INO_2$ (M^+): 345.02202, found: 345.022506. Anal. Calcd for $C_{13}H_{16}NO_2I$ (345.18): C, 45.23; H, 4.67; N, 4.06. Found: C, 45.38; H, 4.60; N, 3.86.

*4.4.12. 6-Bromomethyl-3-(2-ethoxyphenyl)-5,6-dihydro-4H-[1,2]oxazine (**4l**)*

Starting with 1-(2-ethoxyphenyl)pent-4-en-1-one oxime **3e** (0.329 g, 1.50 mmol) and NBS (0.267 g, 1.50 mmol) in CH_2Cl_2 (7.5 mL), **4l** was isolated as a brownish viscous oil (0.256 g, 57%). ^{1}H NMR (250 MHz, $CDCl_3$): δ=1.40 (t, ^3J=7.0 Hz, 3H, OCH_2CH_3), 1.89 (m, 1H, $CHCH_2CH_2$), 2.23 (m, 1H, $CHCH_2CH_2$), 2.69 (dd, ^2J=8.2 Hz, ^3J=5.7 Hz, 2H, CCH_2), 3.47 (dd, ^2J=10.4 Hz, ^3J=7.3 Hz, 1H, $CHCH_2Br$), 3.62 (dd, ^2J=10.4 Hz, ^3J=4.9 Hz, 1H, $CHCH_2Br$), 4.05 (q, ^3J=7.0 Hz, 2H, OCH_2CH_3), 4.11 (m, 1H, $OCHCH_2$), 6.92 (m, 2H, CH_{Ar}), 7.32 (m, 2H, CH_{Ar}). ^{13}C NMR (62.9 MHz, $CDCl_3$): δ=14.8 (OCH_2CH_3), 22.7 (CH_2), 23.9 (CH_2), 32.5 (CH_2Br), 63.8 (OCH_2CH_3), 73.9 (CHO), 111.9 (CH_{Ar}), 120.6 (CH_{Ar}), 125.8 (C), 129.6 (CH_{Ar}), 130.4 (CH_{Ar}), 156.6, 158.5 (C). IR (ATR, cm^{-1}): $\tilde{\nu}$=3061 (br, w), 2976 (w), 2929 (w), 1600 (m), 1491 (m), 1475 (w), 1446 (s), 1391 (w), 1291 (m), 1236 (s), 1161 (w), 1122 (m), 1039 (s), 1023 (s), 924 (w), 897 (s), 800 (w), 750 (s), 682 (w), 656 (w). MS (GC/MS, 70 eV): *m*/*z* (%)=299 (M^+, ^{81}Br, 7), 297 (M^+, ^{79}Br, 7), 267 (4), 265 (4), 204 (34), 174 (24), 158 (60), 145 (100), 132 (21), 103 (9), 91 (35), 77 (18). HRMS (EI): calcd for $C_{13}H_{16}O_2NBr$ (M^+): 297.03589, found: 297.035775.

*4.4.13. 6-Bromomethyl-3-(4-ethoxyphenyl)-5,6-dihydro-4H-[1,2]oxazine (**4m**)*

Starting with 1-(4-ethoxyphenyl)pent-4-en-1-one oxime **3f** (0.438 g, 2.00 mmol) and NBS (0.356 g, 2.00 mmol) in CH_2Cl_2 (10.0 mL), **4m** was isolated as a colourless solid (0.519 g, 87%); mp 130–135 °C. ^{1}H NMR (250 MHz, $CDCl_3$): δ=1.41 (t, ^3J=7.0 Hz, 3H, OCH_2CH_3), 1.91 (m, 1H, $CHCH_2CH_2$), 2.28 (m, 1H, $CHCH_2CH_2$), 2.65 (m, 2H, CCH_2), 3.44 (dd, ^2J=10.8 Hz, ^3J=7.0 Hz, 1H, $CHCH_2Br$), 3.60 (dd, ^2J=10.8 Hz, ^3J=5.0 Hz, 1H, $CHCH_2Br$), 3.98 (m, 1H, $OCHCH_2$), 4.04 (q, ^3J=7.0 Hz, 2H, OCH_2CH_3), 6.88 (d, ^3J=9.0 Hz, 2H, CH_{Ar}), 7.61 (d, ^3J=9.0 Hz, 2H, CH_{Ar}). ^{13}C NMR (62.9 MHz, $CDCl_3$): δ=14.7 ($OCHCH_3$), 21.2 (CH_2), 22.9 (CH_2), 32.4 (CH_2Br), 63.5 (OCH_2CH_3), 73.7 ($OCHCH_2$), 114.3 (CH_{Ar}), 126.7 (CH_{Ar}), 127.6, 154.5, 160.2 (C). IR (ATR, cm^{-1}): $\tilde{\nu}$=2977 (w), 2909 (br, w), 1608 (w), 1590 (m), 1511 (m), 1479 (m), 1449 (br, w), 1414 (w), 1392 (m), 1384 (m), 1356 (m), 1337 (m), 1292 (m), 1247 (s), 1225 (m), 1170 (m), 1116 (m), 1093 (w), 1064 (w), 1043 (m), 1022 (m), 988 (m), 941 (w), 911 (m), 852 (m), 816 (s), 763 (m), 664 (m), 621 (m), 547 (s). MS (GC/MS, 70 eV): *m*/*z* (%)=299 (M^+, ^{81}Br, 98), 297 (M^+, ^{79}Br, 100), 268 (3), 204 (28), 176 (17), 148 (22), 147 (20), 134 (21), 119 (56), 91 (22), 77 (11), 65 (20). HRMS (EI): calcd for $C_{13}H_{16}BrNO_2$ (M^+): 297.03589, found: 297.035839. Anal. Calcd for $C_{13}H_{16}NO_2Br$ (298.18): C, 52.36; H, 5.41; N, 4.70. Found: C, 52.01; H, 5.32; N, 4.52.

*4.4.14. 6-Bromomethyl-4-methyl-3-phenyl-5,6-dihydro-4H-[1,2]oxazine (**4n**)*

Starting with 2-methyl-1-phenyl-pent-4-en-1-one oxime **3j** (0.567 g, 3.00 mmol) and NBS (0.534 g, 3.00 mmol) in CH_2Cl_2 (15 mL), **4n** was isolated as a brownish viscous oil (0.584 g, 73%). The product was isolated as an inseparable mixture of diastereomers (dr=1:1). Therefore, most signals are splitted. ^{1}H NMR (250 MHz, $CDCl_3$): δ=1.10, 1.18 (d, ^3J=7.2 Hz, 3H, $CHCH_3$), 1.98 (m, 2H, $CHCH_2CH$), 3.07 (m, 1H, $CHCH_3$), 3.47 (m, 1H, CH_2I), 3.62 (m, 1H, CH_2I), 4.04 (m, 1H, $OCHCH_2$), 7.36–7.41 (m, 3H, CH_{Ar}), 7.41–7.62 (m, 2H, CH_{Ar}). ^{13}C NMR (62.9 MHz, $CDCl_3$): δ=19.2, 20.2 ($CHCH_3$), 25.4, 27.9 ($CHCH_3$), 30.3, 32.6 ($CHCH_2CH$), 32.8, 33.2 (CH_2Br), 70.8, 74.5 (OCH), 126.3, 126.8 (CH_{Ar}), 128.4, 128.6 (CH_{Ar}), 129.2, 129.5 (CH_{Ar}), 134.7 (C), 159.2, 161.9 (C). IR (ATR, cm^{-1}): $\tilde{\nu}$=3055 (br, w), 2964 (w), 2932 (w), 2893 (w), 1588 (w), 1563 (w), 1493 (w), 1452 (w), 1441 (m), 1417 (m), 1376 (m), 1340 (w), 1290 (w), 1262 (m), 1226 (m), 1177 (w), 1138 (w), 1096 (w), 1083 (m), 1043 (m), 1011 (m), 973 (m), 919 (s), 902 (s), 863 (m), 817 (w), 765 (s), 745 (s), 689 (s), 656 (s), 628 (m), 557 (m). MS (GC/MS, 70 eV): *m*/*z* (%)=269 (M^+, ^{81}Br, 92), 267 (M^+, ^{79}Br, 93), 188 (7), 174 (90), 146 (17), 132 (45), 117 (90), 104 (78), 91 (42), 77 (98), 55 (100). HRMS (EI): calcd for $C_{12}H_{14}NOBr$ (M^+): 267.01146, found: 267.011677.

*4.4.15. 6-Bromomethyl-3-(4-methoxyphenyl)-4-methyl-5,6-dihydro-4H-[1,2]oxazine (**4o**)*

Starting with 1-(4-methoxyphenyl)-2-methylpent-4-en-1-one oxime **3k** (0.519 g, 2.70 mmol) and NBS (0.480 g, 2.70 mmol) in CH_2Cl_2 (13.5 mL), **4o** was isolated as a colourless solid (0.201 g, 25%); mp 88–91 °C. The product was isolated as an inseparable mixture of diastereomers (dr=1:1). Therefore, most signals are splitted. For most of the diastereomers, the difference of the chemical shifts is very small. Therefore, only a single value is given. ^{1}H NMR (250 MHz, $CDCl_3$): δ=1.19 (d, ^3J=7.3 Hz, 3H, $CHCH_3$), 1.96 (m, 2H, $CHCH_2CH$), 3.03 (m, 1H, $CHCH_3$), 3.40 (dd, ^2J=10.6 Hz, ^3J=6.4 Hz, 1H, $CHCH_2Br$), 3.56 (dd, ^2J=10.6 Hz, ^3J=5.1 Hz, 1H, $CHCH_2Br$), 3.82 (s, 3H, OCH_3), 4.04 (m, 1H, $OCHCH_2$), 6.90 (d, ^3J=9.0 Hz, 2H, CH_{Ar}), 7.55 (d, ^3J=9.0 Hz, 2H, CH_{Ar}). ^{13}C NMR (75.5 MHz, $CDCl_3$): δ=20.3 ($CHCH_3$), 25.3 ($CHCH_3$), 30.4 ($CHCH_2$), 32.9 (CH_2Br), 55.3 (OCH_3), 70.7 ($OCHCH_2$), 114.0 (CH_{Ar}), 127.1 (C), 127.6 (CH_{Ar}), 158.7 (C), 160.7 (C). IR (ATR, cm^{-1}): $\tilde{\nu}$=2965 (w), 2931 (w), 2877 (w), 1606 (s), 1510 (s), 1461 (m), 1374 (w), 1294 (m), 1245 (s), 1176 (m), 1109 (w), 1095 (w), 1079 (w), 1044 (m), 1029 (m), 1013 (s), 969 (m), 911 (s), 831 (s), 813 (s), 755 (m), 655 (m), 624 (m). MS (GC/MS, 70 eV): *m*/*z* (%)=299 (M^+, ^{81}Br, 100), 297 (M^+, ^{79}Br, 99.7), 218 (2), 204 (23), 186 (11), 162 (15), 160 (15), 147 (32), 134 (55), 133 (50), 115 (16), 103 (20), 91 (16), 77 (21). HRMS (EI): calcd for $C_{13}H_{16}NO_2Br$ (M^+): 297.03589, found: 297.035394.

*4.4.16. 3-Iodomethyl-4,4a,5,6-tetrahydro-3H-naphtho[1,2-c][1,2]oxazine (**4p**)*

Starting with 2-allyl-3,4-dihydro-2*H*-naphthalen-1-one oxime **3l** (0.221 g, 1.1 mmol), I_2 (0.559 g, 2.2 mmol) and a saturated aqueous solution of $NaHCO_3$ (11.0 mL) in CH_2Cl_2 (18.0 mL), **4p** was isolated as a colourless solid (0.345 g, 96%); mp 105–107 °C. The product was isolated as an inseparable mixture of diastereomers (dr=1:1). Therefore, most signals are splitted. For most of the diastereomers, the difference of the chemical shifts is very small. Therefore, only a single value is given. ^{1}H NMR (300 MHz, $CDCl_3$): δ=1.37–1.65 (m, 2H, CH_2), 2.09 (m, 1H, CH_2), 2.33 (m, 1H, CH_2), 2.48 (m, 1H, $CCHCH_2$), 2.85 (m, 2H, CH_2), 3.20 (dd, ^2J=10.6 Hz, ^3J=7.0 Hz, 1H, $CHCH_2I$), 3.36 (dd, ^2J=10.6 Hz, ^3J=5.0 Hz, 1H, $CHCH_2I$), 3.88 (m, 1H, OCH), 7.14 (m, 3H, CH_{Ar}), 7.96 (d, ^3J=7.8 Hz, 1H, CH_{Ar}). ^{13}C NMR (75.5 MHz, $CDCl_3$): δ=5.8 (CH_2I), 28.9 (CH_2), 29.0 (CH_2), 32.0 (CH_2), 33.0 ($CCHCH_2$), 73.6, 75.3 (OCH), 124.7 (CH_{Ar}), 126.5 (CH_{Ar}), 129.0 (CH_{Ar}), 129.6 (CH_{Ar}), 129.5 (C), 138.1 (C), 154.4 (C). IR (ATR, cm^{-1}): $\tilde{\nu}$=3016 (br, w), 2924 (w), 2855 (w), 2831 (w), 1728 (w), 1610 (w), 1479 (w), 1445 (w), 1431 (w), 1372 (w), 1323 (w), 1307 (w), 1291 (w), 1259 (w), 1198 (s), 1151 (w), 1125 (w), 1098 (w), 1079 (w), 1009 (s), 968 (m), 945 (m), 919 (s), 880 (s), 763 (s), 728 (s), 677 (m), 646 (m), 620 (w). MS (EI, 70 eV): *m*/*z* (%)=327 (M^+, 100), 297 (4), 182 (13), 170 (15), 144 (16), 128 (50), 116 (23), 89 (11), 77 (13). HRMS (EI): calcd for $C_{13}H_{14}INO$ (M^+): 327.01146, found: 327.010903.

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